UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,986	03/22/2004	Shinichiro Yamashita	16869P-111500US	2191

20350	7590	03/10/2006

TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER
MOORE, PATRICK M

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 03/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/806,986	YAMASHITA, SHINICHIRO
	Examiner	**Art Unit**	
	Patrick M. Moore	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 March 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-19</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-19</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2/23/05, 03/22/04</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

1.   Claims 1-5, 7, 9, 17 and 19 were amended on 24 January 2005.

2.   Claims 1-19 have been examined.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of
> making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the
> art to which it pertains, or with which it is most nearly connected, to make and use the same and shall
> set forth the best mode contemplated by the inventor of carrying out his invention.

3.   Claim 19 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply

with the enablement requirement.

a. The claim(s) contains subject matter which was not described in the

specification in such a way as to enable one skilled in the art to which it pertains,

or with which it is most nearly connected, to make and/or use the invention.

Claim 19 recites the limitation "a third storage volume" which receives "the

second heart beat message" and a "heart beat detection unit configured to detect

the second heart beat message written to the third storage volume". On page 16

of the specification Applicant discloses three volumes (e.g. "LU01, LU02, LU03")

for both Storage Unit A & B, respectively. However, Applicant's specification

does not describe the behavior of receiving the second heart beat message and

writing to a third storage volume, as per Claim 19. In order to perform a more

complete action on the merits, Examiner assumes that Applicant intended Claim

19 to recite "the second storage volume" instead of the limitation: "the third

storage volume".

Appropriate correction is required.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly
claiming the subject matter which the applicant regards as his invention.

4.   Claims 9, 12, 17 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

   a. Claim 9 recites the limitation "the replicated heart beat" in Line 11. There is

insufficient antecedent basis for this limitation in the claim.

   b. Claim 12 recites the limitation "the node heartbeat" in Line 2. There is

insufficient antecedent basis for this limitation in the claim.

   c. Claim 17 recites the limitation "the first information processing includes" in

Line 22. There is insufficient antecedent basis for this limitation in the claim.

Examiner assumes that Applicant intended to claim "the first information

processing *unit* includes".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set
forth in section 102 of this title, if the differences between the subject matter sought to be patented and
the prior art are such that the subject matter as a whole would have been obvious at the time the
invention was made to a person having ordinary skill in the art to which said subject matter pertains.
Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Yanai et al (US Patent # 6,173,377), herein Yanai, in view of Yamagami (US PGPub #

2002/0095489).

a. As per Claim 1, **Yanai** discloses a storage system, comprising: a first storage

unit having a first storage volume for storing data **[Figure 1, #14, #20 & Column**

7, Lines 44-59]; and a second storage unit communicably coupled **[Figure 1, #**

60] to the first storage unit and having a second storage volume for storing data

[Figure 1, #46, #48, Column 8, Lines 35-59 & Column 9, Lines 5-21], wherein

the first storage unit includes a data transmission unit configured to transmit

replicated data to a storage unit when data is written to the first storage volume

[Figure 1, #32 & Column 7, Line 60 through Column 8, Line 13]; the second

storage unit further includes a data reception unit configured to receive the

replicated data and writing the replicated data to the second storage volume

[Figure 1, #68, Column 9, Lines 33-40 & Column 10, Line 39 through

Column 11, Line 45]. **Yanai** does not expressly disclose the periodic writing of

a heartbeat signal to a primary volume.

b. Also per Claim 1, **Yamagami** discloses a first storage unit further including a

disk heart beat write unit configured to repeatedly write a first heart beat

message to the first storage volume at intervals within a predetermined time

[¶0010-0011 & ¶0053]; and a second storage unit including a disk heart beat

detection unit configured to detect a replication of the first heart beat message to

be written to the second storage volume by the data reception unit [¶0010, ¶0011 & ¶0053].

c. **Yanai** and **Yamagami** are analogous art because they are from a similar problem solving area: remote data mirroring to reduce data loss during computer system failure. At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the automatic synchronization of remote mirrored pairs described by **Yanai** with the heartbeat signal taught by **Yamagami**. The suggestion/motivation for doing so would have been to increase the reliability and accuracy of a mirrored pair failover situation and to minimize attempts for primary and secondary storage systems to take simultaneous control as taught by **Yamagami** in ¶0009.

d. As per Claim 2, **Yanai** further discloses the storage system according to claim 1, wherein: a first information processing unit is communicably coupled to the first storage unit **[Figure 1, #32 & Column 7, Line 60 through Column 8, Line 13]**, a second information processing unit is communicably coupled to the second storage unit **[Figure 1, #68, Column 9, Lines 33-40 & Column 10, Line 39 through Column 11, Line 45]**.

e. Also per Claim 2, **Yamagami** further discloses the first information processing unit further comprises a node heart beat write request unit configured to repeatedly transmit a request to write a second heart beat message to the first storage volume, to the first storage unit at intervals within a predetermined time

[¶0018, ¶0053 & ¶0083], the first storage unit further comprises a node heart

beat write unit configured to write the second heart beat message to the first

storage volume according to the write request of the second heart beat message

[¶0084 & ¶0088], the second storage unit further includes a node heart beat

transmission unit configured to transmit a replication of the second heart beat

message to be written to the second storage volume by the data reception unit to

the second information processing unit [¶0091], and the second information

processing unit further comprises a node heart beat detection unit configured to

detect the replication of the second heart beat message to be transmitted by the

node heart beat transmission unit [¶0100].

f.   As per Claim 3, **Yamagami** further discloses the storage system according to

claim 1, wherein the first storage unit further comprises a disk heart beat creation

unit configured to create disk heart beat signals to provide the first heart beat

message [¶0053].

g.   As per Claim 4, **Yamagami** further discloses the storage system according to

claim 2, wherein the first information processing unit further comprises a node

heart beat creation unit configured to create node heart beat signals to provide

the second heart beat message **[Figure 1, #101a & ¶0084]**.

h.   As per Claim 5, **Yamagami** further discloses the storage system according to

claim 2, wherein: the second storage unit further includes a disk heart beat

detection result transmission unit configured to transmit a detection result of the

replication of the first heart beat message by the disk heart beat detection unit to

the second information processing unit [¶0091], and the second information

processing unit further includes an operation status decision unit configured to

determine operation status of a first computer system, the first computer system

including the first information processing unit and the first storage unit, using

detection of the first heart beat message and the second heart beat message

[¶0092-0096].

i.   As per Claim 6, **Yamagami** further discloses the storage system according to

claim 5, wherein the second information processing unit further comprises a fail-

over control unit which transfers information processing from the first computer

system to a second computer system, the second computer system including the

second information processing unit and the second storage unit depending upon

operation status of the first computer system [¶0033].

j.   As per Claim 7, **Yamagami** further discloses the storage system according to

claim 5, wherein the second information processing unit further comprises an

operation status display unit configured to provide the operation status of the first

computer system to a user interface **[Figure 2, #250 & ¶0063]**.

k.   As per Claim 8, **Yamagami** further discloses the storage system according to

claim 1, wherein the first heart beat message includes at least one of: (1)

identification information of the first heart beat message **[Figure 3, #310]**, (2)

time information indicating when the first heart beat message was created

[Figure 3, #320], (3) first location information indicating a storage position of the first storage volume where the first heart beat message is written [Figure 3, #330], and (4) second information indicating the storage position of the second storage volume where the first heart beat message is written [¶0063]. Examiner understands Applicant's claimed "storage position of the second storage volume" to be inherent to a mirrored pair, as disclosed in ¶0053 of Yamagami, because a heartbeat message that is stored on any storage medium must have a storage position.

I. As per Claim 9, Yanai discloses a method for controlling a storage system which system includes a first storage unit having a first storage volume for storing data [Figure 1, #14, #20 & Column 7, Lines 44-59], and a second storage unit in communication with the first storage unit and having a second storage volume for storing data [Figure 1, #46, #48, Column 8, Lines 35-59 & Column 9, Lines 5-21], wherein the first storage unit includes a data transmission unit configured to transmit replicated data to the second storage unit when the data is written to a first storage volume [Figure 1, #32 & Column 7, Line 60 through Column 8, Line 13], and the second storage unit includes a data reception unit configured to receive the replicated data and writing the replicated data to the second storage volume [Figure 1, #68, Column 9, Lines 33-40 & Column 10, Line 39 through Column 11, Line 45]. Yanai does not expressly disclose the periodic writing of a heartbeat signal to a primary volume.

m. Also per Claim 9, **Yamagami** discloses the method comprising: in the first storage unit, repeatedly writing a first heart beat message to the first storage volume at intervals [¶0010-0011 & ¶0053]; and in the second storage unit, detecting the replicated first heart beat message to be written to the storage volume [¶0010, ¶0011 & ¶0053]. There exists identical motivation to combine **Yanai** and **Yamagami** as above.

n. As per Claim 10, **Yanai** further discloses the method according to claim 9, in which a first information processing unit communicates with the first storage unit **[Figure 1, #32 & Column 7, Line 60 through Column 8, Line 13]** and a second information processing unit communicates with the second storage unit **[Figure 1, #68, Column 9, Lines 33-40 & Column 10, Line 39 through Column 11, Line 45]**,

o. Also per Claim 10, **Yamagami** further discloses the method comprising: repeatedly transmitting from the first information processing unit a request to write a second heart beat message to the first storage volume [¶0018, ¶0053 & ¶0083]; writing the second heart beat message to the first storage volume [¶0084 & ¶0088]; transmitting from the second storage unit to the second information processing, unit a replication of the second heart beat message [¶0091]; and at the second information processing unit, detecting the replication of the second heart beat message [¶0100].

p. As per Claim 11, **Yamagami** further discloses the method according to claim

9, further comprising creating disk heart beat signals at the first storage unit to

provide the first heart beat message [¶0053].

q. As per Claim 12, **Yamagami** further discloses the method according to claim

10, further comprising creating the node heart beat signals at the first information

processing unit to provide the second heart beat message **[Figure 1, #101a &**

¶0084].

r.   As per Claim 13, **Yamagami** further discloses the method according to claim

10, further comprising: from the second storage unit, transmitting a detection

result of the first heart beat message to the second information processing unit

[¶0091]; and at the second information processing unit, determining operational

status of a first computer system which includes the first information processing

unit and the first storage unit using reception of the first heart beat message and

the second heart beat message [¶0092-0096].

s. As per Claim 14, **Yamagami** further discloses the method according to claim

13 further comprising transferring information processing from the first computer

system to a second computer system which includes the second information

processing unit and the second storage unit according to the operational status

of the first computer system [¶0033].

t.   As per Claim 15, **Yamagami** further discloses the method according to claim

13 further comprising at the second information processing unit providing the

operational status of the first computer system to a user interface **[Figure 2,**

#250 & ¶0063].

u. As per Claim 16, **Yamagami** further discloses the method according to claim

9, wherein the first heart beat message comprises at least one of: (1)

identification information of the first heart beat message **[Figure 3, #310]**; (2)

time information indicating when the first heart beat message was created

[Figure 3, #320]; (3) information indicating a storage position of the first storage

volume **[Figure 3, #330]**; and (4) information indicating a storage position of the

second storage volume **[¶0063]**.

v. As per Claim 17, **Yanai** discloses a storage system comprising: a first

computer system including a first storage unit having a first storage volume for

storing data **[Figure 1, #14, #20 & Column 7, Lines 44-59]**, and a first

information processing unit communicably coupled to the first storage unit

[Figure 1, #32 & Column 7, Line 60 through Column 8, Line 13]; and a

second computer system including a second storage unit having a second

storage volume for storing data **[Figure 1, #46, #48, Column 8, Lines 35-59 &**

Column 9, Lines 5-21], and a second information processing unit communicably

coupled to the first storage unit **[Figure 1, #68, Column 9, Lines 33-40 &**

Column 10, Line 39 through Column 11, Line 45]; wherein the first storage

unit includes a data transmission unit configured to transmit replicated data to the

second storage unit when the data is written to the first storage volume **[Figure**

1, #32 & Column 7, Line 60 through Column 8, Line 13], the second storage

unit includes a data reception unit configured to receive the replicated data and

writing the replicated data to the second storage volume **[Figure 1, #68, Column**

9, Lines 33-40 & Column 10, Line 39 through Column 11, Line 45].

w. Also per Claim 17, **Yamagami** discloses the first storage unit includes a disk

heart beat creation unit configured to repeatedly create a first heart beat

message, and a disk heart beat write unit configured to repeatedly write the first

heart beat message to the first storage volume at intervals **[¶0010-0011 &**

¶0053]; the second storage unit further includes a disk heart beat detection unit

configured to detect the replicated first heart beat message, and a disk heart beat

detection result transmission unit configured to transmit a signal indicating receipt

of the replicated first heart beat message by the disk heart beat detection unit to

the second information processing unit **[¶0010, ¶0011 & ¶0053]**; the first

information processing includes a node heart beat creation unit configured to

repeatedly create a second heart beat message, and a node heart beat write

request unit configured to repeatedly transmit a request to write the second heart

beat message to the first storage volume **[Figure 1, #101a & ¶0084]**; the first

storage unit includes a node heart beat write unit configured to write the second

heart beat message to the first storage volume according to the write request of

the second heart beat message **[¶0084 & ¶0088]**; the second storage unit

includes a node heart beat transmission unit configured to transmit to the second

information processing unit the replication of the second heart beat message

written to the second storage volume by the data reception unit **[¶0091]**; the

second information processing unit includes a node heart beat detection unit

configured to detect the replication of the second heart beat message [¶0100],

and an operation status unit configured to determine operational status of the first

computer system according to the second heart beat message and the first heart

beat message, and a fail-over execution unit configured to transfer information

processing from the first computer system to the second computer system

according to the operational status of the first computer system [¶0033]. There

exists identical motivation to combine **Yanai** and **Yamagami** as above.

x. As per Claim 18, **Yamagami** further discloses the storage system according

to claim 17, wherein: the first heart beat message includes at least one of: (1)

identification information of the first heart beat message **[Figure 3, #310]**, (2)

time information indicating when the first heart beat message was created

[Figure 3, #320], (3) information indicating a storage position of the first storage

volume **[Figure 3, #330]**, and (4) information indicating a storage position of the

second storage volume; and the second heart beat message includes at least

one of: (1) identification information of the second heart beat message **[Figure 3,**

#310], (2) time information indicating when the second heart beat message was

created **[Figure 3, #320]**, (3) information indicating a storage position of the first

storage volume **[Figure 3, #330]**, and (4) information indicating a storage

position of the second storage volume [¶0063].

y. As per Claim 19, **Yanai** discloses a first storage control unit communicably

coupled to a second storage control unit configured to control reading and writing

of data to first, second and third storage volumes, including: a data transmission
unit configured to transmit replicated data to the second storage control unit
when data is written to the first storage volume **[Column 10, Line 39 through
Column 11, Line 45]**.

z. Also per Claim 19, **Yamagami** discloses a disk heart beat write unit
configured to write a first heart beat message to the first storage volume **[¶0010-
0011 & ¶0053]**; a data reception unit configured to receive a replicated second
heart beat message written to the second storage volume by the second storage
control unit **[¶0010, ¶0011 & ¶0053]**, and in response write the second heart
beat message to the third storage volume; and a disk heart beat detection unit
configured to detect the second heart beat message written to the third storage
volume **[¶0010, ¶0011 & ¶0053]**. There exists identical motivation to combine
Yanai and **Yamagami** as above.

Conclusion

Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Patrick M. Moore whose telephone number is (571) 272-
1239. The examiner can normally be reached on M-F 8:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Mano Padmanabahn can be reached on (571) 272-4210. The fax phone
number for the organization where this application or proceeding is assigned is 571-
273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

PMM

MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER